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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ULRICH BONNE, TOM REZACHEK, and ROBERT HIGASHI

Appeal 2010-001796
Application 10/671,930
Technology Center 1700

Before BEVERLY A. FRANKLIN, LINDA M. GAUDETTE, and
MICHAEL P. COLAIANNI, *Administrative Patent Judges*.

GAUDETTE, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's decision¹ finally rejecting claims 1-10 and 22-30.² We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

¹ Final Office Action mailed Oct. 17, 2007 ("Final").

² Appeal Brief filed Feb. 18, 2008 ("App. Br."), as corrected in the Response to Notification of Non-compliant Appeal Brief, filed Mar. 28, 2008.

The invention is directed to a sensor for the identification and quantification of fluids. (Spec.³ 1:14-18.) The independent claims (claims 1 and 22) are representative of the invention and are reproduced below from the Claims Appendix to the Appeal Brief:

1. A fluid sensor comprising:

a concentrator;

a separator connected to the concentrator;

a phased heater array having a first plurality of heating elements situated in the concentrator and a second plurality of heating elements situated in the separator, wherein the concentrator heating elements and separator heating elements are in a pre-arranged pattern;

a ratio control mechanism for changing the ratio of concentrator heating elements relative to separator heating elements, the ratio control mechanism connected to the phased heater array; and

at least a first detector connected to either the concentrator or the separator.

22. A fluid sensor comprising:

a concentrator having a first plurality of heater elements;

a separator having a second plurality of heater elements corresponding to the number of concentrator heater elements;

a controller connected to the concentrator and separator; and

a detector connected to either the concentrator or separator; and

wherein a ratio of the concentrator heater elements to the separator heater elements may be changed via the controller.

³ Specification filed Sep. 26, 2003.

Appellants request review of the following grounds of rejection (App. Br. 5):

1. Claims 1, 2, 5, 6, 22-24, and 28-30 under 35 U.S.C. § 103(a) as unpatentable over Bonne (US 6,393,894 B1, issued May 28, 2002)⁴ (Final 2-4; Ans.⁵ 3-6); and

2. Claims 3, 4, 7-10, and 25-27⁶ under 35 U.S.C. § 103(a) as unpatentable over Bonne in view of Kubisiak (US 6,169,965, issued Jan. 2, 2001) (Final 5-6; Ans. 6-7).

Appellants confine their arguments to independent claims 1 and 22. (*See* Ans. 5-12.) Accordingly, the appealed dependent claims stand or fall with these claims. *See* 37 C.F.R. § 41.37(c)(1)(vii).

The Examiner concedes Bonne fails to expressly teach the use of more than one separator heating element as required by claims 1 and 22 (Ans. 4), a pre-arranged pattern of concentrator heating elements and separator heating elements as recited in claim 1 (*cf.* Ans. 5), and a plurality of concentrator heater elements corresponding to a plurality of separator heater elements as recited in claim 22 (Ans. 5). However, the Examiner finds “[t]he number of separator heater elements is an art-recognized result-effective variable.” (Ans. 5, 13.) The Examiner finds, more specifically, that increasing the means for separating provides the well-known and expected results of “a more precise separation of selected components in a mixture” and “optimiz[ation of] the desired level of separation.” (Ans. 5,

⁴ Bonne is incorporated by reference in the present Application. (Spec. 1:21-2:1.)

⁵ Examiner’s Answer mailed Jul. 14, 2009.

⁶ Appellants appear to have inadvertantly failed to include claim 7 as subject to this ground of rejection. (*Cf.* App. Br. 3 (stating claims 1-20 and 22-30 are being appealed).)

13.) The Examiner thus determines “it would have been obvious for one of ordinary skill in the art to modify Bonne by multiplying the number of separator heating elements for multiplied effect” (Ans. 8) in order “to gain the advantages of either separating more selected constituents or to enable a more precise separation of selected constituents” (Ans. 9). With respect to the claim 1 requirement of “a pre-arranged pattern,” the Examiner finds “it would have been obvious to one of ordinary skill in the art to plan how the concentrator and separator heating elements are to be arranged in the sensor prior to building it.” (Ans. 5.) With respect to claim 22, the Examiner finds “Bonne teaches concentrator heating elements and teaches that ‘any number of downstream [concentrator heating] elements may be heated . . . to produce an even further increased concentration level at the output of the concentrator’ (Column 3 lines 13-17).” (Ans. 5-6.) The Examiner concludes “[i]t would have been obvious to one of ordinary skill in the art to meet the number of heating elements required in claim 22 by modifying Bonne and selecting the number of concentrator and separator [elements] in order to obtain the desired concentration of the desired compound.” (Ans. 5-6.)

Appellants contend the Examiner reversibly erred in rejecting claims 1 and 22, raising the following issues for our consideration⁷:

1. Is the Examiner’s proposed motivation for modifying Bonne to include additional separator heating elements as recited in claims 1 and 22 based on improper hindsight reasoning (*see* App. Br. 7, ll. 7-10)?

⁷ Any remaining arguments in support of reversible error not discussed herein have been fully addressed by the Examiner and are deemed unpersuasive for the reasons stated in the Answer.

2. Is the evidence of record insufficient to support the Examiner's determination that Bonne suggests the ratio control limitations recited in claims 1 and 22 (*see* App. Br. 8, 10)?

3. Would the Examiner's proposed modification of Bonne fail to result in a pre-arranged pattern of concentrator heating elements and separator heating elements as recited in claim 1 (*see* App. Br. 6)?

4. Does the prior art teach away from the Examiner's proposed modification of Bonne to include a corresponding number of concentrator and separator heating elements as recited in claim 22 (App. Br. 10)?

We answer each of these questions in the negative for the reasons explained in the Answer (Ans. 7-15), which we expand upon below.

Issue 1: Is the Examiner's proposed motivation for modifying Bonne to include additional separator heating elements as recited in claims 1 and 22 based on improper hindsight reasoning?

Bonne discloses a gas sensor which includes a concentrator having two or more interactive elements spaced along and exposed to [a] sample fluid stream. Each of the interactive elements include[s] an interactive substance that adsorbs and desorbs selected constituents of the sample fluid stream, depending on the temperature of the interactive element. Two or more heater elements are provided, with each heater element in thermal communication with a corresponding interactive element.

A controller energizes the heater elements in a time phased sequence . . . such that each of the corresponding interactive elements become heated and desorb[s] selected constituents into the sample fluid stream. . . . [A] large number, N, of interactive elements may be used to achieve the desired multiplication of concentration of constituent gases in the concentration pulse by a factor N.

(Col. 1, l. 60-col. 2, l. 11.) The resulting concentration pulse is provided to a separator which includes a separation heater to separate selected gas

constituents into individual constituent components. (Col. 2, ll. 18-20; col. 8, ll. 34-37.) The separator heater is energized by the same heater control block used to energize the heater elements of the concentrator. (Col. 7, ll. 13-14.) A detector is then used to detect the concentration of each constituent that elutes from the separator. (Col. 2, ll. 20-22.) According to Bonne, the “multiplication effect” provided by the concentrator heaters “can significantly increase the concentration of the gas constituents at the detector, thereby increasing the effective sensitivity of the detector.” (Col. 1, ll. 54-57.)

“[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007).

Appellants argue “the prior art does not recognize the number of heater elements is a result-effective variable, therefore any optimization is not a result-effective variable and not within the skill of one of ordinary skill in the art.” (App. Br. 8.) Based on Bonne’s disclosure, we agree with the Examiner’s determination that the ordinary artisan would reasonably expect increasing the number of separator heaters (i.e., devices similar to the concentrator heaters) to provide an improvement in separation similar to the improvement in concentration achieved by increasing the number of concentration heaters. Further, based on Bonne’s teaching that a desired concentration of constituent gases can be readily achieved by adjusting the number of concentrator heaters, it was reasonable for the Examiner to

conclude that the optimum number of separator heaters could likewise be determined through nothing more than routine experimentation.

Issue 2: Is the evidence of record insufficient to support the Examiner's determination that Bonne suggests the ratio control limitations recited in claims 1 and 22?

Appellants concede Bonne discloses a “time phased operation of the concentration heaters while the separation heater remains constantly on.” (Rep. Br.⁸ 3-4.) The Examiner finds this time-phased operation controls the ratio of concentrator heating elements relative to separator heating elements, because Bonne “chang[es] a ratio of active concentrator heater elements to active separator heating elements from 1:1 to 0:1.” (Ans. 10.)

Appellants argue Bonne fails to disclose the claimed ratio control limitations because Bonne only discloses a single separation heater and one of ordinary skill in the art would have understood “the ratio control mechanism claimed varies the ratio of multiple concentrator heaters to multiple separation heaters.” (Rep. Br. 4.) This argument is unpersuasive because it fails to address the Examiner's reasoned determination (*see* discussion of Issue 1 *supra*) that one of ordinary skill in the art would have found it obvious to have modified Bonne's sensor to include a plurality of separation heating elements.

Appellants argue “[t]he Examiner's interpretation of ‘ratio control mechanism’ is not consistent with the specification or with the interpretation of one of ordinary skill in the art upon reading the specification.” (Rep. Br. 4.)

⁸ Reply Brief filed Sep. 14, 2009.

The Specification description of the ratio control is limited to the following: “The ratio of concentrator to separator heater elements may be set or changed by a ratio control mechanism 490 connected to controller 130.” (Spec. 20:9-11; *see also*, Fig. 2.)

Appellants have not explained, nor is it apparent to us, how the Examiner’s interpretation of the claim 1 and claim 22 ratio control limitations as encompassing Bonne’s time-phased operation of concentrator heating elements relative to separator heating elements, is inconsistent with the description of ratio control in the Specification.

Issue 3: Would the Examiner’s proposed modification of Bonne fail to result in a pre-arranged pattern of concentrator heating elements and separator heating elements as recited in claim 1?

Appellants contend that Bonne’s sensor, even if modified to include additional separator heating elements “would still lack the [claimed] pre-arranged pattern of concentrator to separator heating elements.” (App. Br. 6.)

Interpreting the claim phrase “pre-arranged pattern” in light of the claims and Specification, we see no basis for limiting the concentrator and separator heating elements to a specific, defined pattern.⁹ Appellants have not explained why the ordinary artisan would not have found it obvious to

⁹ We note the phrase “pre-arranged pattern” appears only in the following passage from the Specification: “The micro gas analyzer may have heater elements 40, 42, . . . , 44, 46 and 140, 142, . . . , 144, 146 fabricated via repeated, sequentially spin-coated (or other deposition means) steps, so that a pre-arranged pattern of concentrator and separator elements are coated with different adsorber materials A, B, C, . . . (known in GC literature as stationary phases).” (Spec. 19:18-23.)

have pre-arranged Bonne's concentrator and separator heaters in some type of a pattern as determined by the Examiner (*see* Ans. 10).

Issue 4: Does the prior art teach away from the Examiner's proposed modification of Bonne to include a corresponding number of concentrator and separator heating elements as recited in claim 22?

Appellants maintain Bonne "already teach[es] a structure that provides a means of achieving improved concentration of the sample constituents, resulting in improved detection," which structure requires only "a single separator heating element in order to achieve the desired detection." (App. Br. 10.) Appellants thus argue "there is no support for the Examiner's assertion that one would have modified Bonne to have a corresponding number of concentrator and separator heating elements to achieve the desired concentration. Bonne appears to teach away from such a modification." (*Id.*)

"A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994).

Appellants have not identified, nor do we find, disclosure in Bonne which may reasonably be viewed as discouraging the ordinary artisan from adding additional separator heaters. Moreover, as discussed above in connection with Issue 1, Appellants have not persuaded us that the Examiner erred in concluding the optimum number of separator heaters, e.g., a number corresponding to the number of concentrator heaters, could readily be

determined through nothing more than routine experimentation. (*See* Ans. 12-15.)

In sum, for the reasons discussed above and in the Answer, Appellants have failed to persuade us of reversible error in the Examiner's obviousness determination. Accordingly, we sustain both grounds of rejection.

The Examiner's decision to reject claims 1-10 and 22-30 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1).

AFFIRMED

Ssl